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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re application of Alexander Conrad et al.

Serial No. 08/421,810 Examiner: E. Holloway III

Filed April 13, 1995 Group Art Unit: 2211

Entitled: INTELLIGENT LOCATOR SYSTEM

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Pittsburgh, Pennsylvania 15219
January 9, 1997

Hon. Commissioner of Patent and Trademarks
Box Patent Appeal
Washington, DC 20231

BRIEF FOR APPELLANT

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Sir:

Attached hereto is the Brief for Appellant in triplicate together with the Government Fee of $150.00.

Respectfully submitted,

Clifford A. Poff

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Agent for Appellant

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Enclosures

I hereby certify that this correspondence has been mailed by first class mail with prepaid postage addressed to the Commissioner of Patents and Trademarks, Box Patent Appeal, Washington DC 20231 on January 9, 1997 by: Debra J. Koch

Debra J. Koch
Date: January 9, 1997

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BRIEF FOR APPELLANT

Sir:

1. Real Party in Interest

The real party in interest is Wescom, Inc. of Jacksonville, Florida.

2. Related Appeals and Interferences

There are no related cases in appeal or in interference.

3. Status of Claims

Claims 47-71 have been finally rejected pursuant to an Official Action of May 9, 1996.

4. Status of Amendments

There have been no amendments subsequent to the final rejection.

5. Summary of Invention

The invention provides an intelligent locator system useful for tracking and locating persons and equipment in a facility such as a hospital or persons and/or product and equipment in a factory, warehouse, retail store or other space. (Page 9, lines 9-17) As illustrated in Figure 1, the system is made up of a central control computer which is labeled ILC (intelligent locator computer) and identified by reference numeral 2. The computer is connected by bus lines $4_1$, $4_2$...$4_n$ to up to 32 ILA's (intelligent locator arbitrators) identified by reference numeral $6_1$, $6_2$---$6_{32}$. (Page 9, lines 17-25) Each ILA is connected by a serial bus 8 to up to 32 ILR's (intelligent locator receivers) $16_1$, $16_2$---$16_{32}$ that are powered by the power supply 14 through lines 10 and 12. (page 10, lines 6-16) Completing the system is a plurality

of ITL's which are infrared transmitter badges $18_1$, $18_2$---$18_N$ each of which transmits a unique bit code which when chosen with 20 bits enables up to 1,048,876 badges to be uniquely recognized by the system. (Page 10, lines 16-22)

The badges 18 are suitable to be worn by persons, animals and/or equipment for infrared transmissions of the unique identification code of each badge. The receivers 16 with infrared detectors are installed in walls, floor, ceilings, structural members and special mountings in a facility to allow detection of the unique code emitted by the badges. The arbitrators $6_1$, $6_2$---$6_{32}$ process the signals from the receivers to determine the unique identification code which is then sent to computer 2 along with start and stop events. The computer "time-stamps" the events and stores the data. (Page 11, lines 1-25) The believed patentable invention is directed to the transmission of coded pulse bursts at diverse time intervals during predetermined time intervals for preventing synchronization with resident signals in a facility, and decoding of received pulse bursts to establish the location of the transmitter in the facility. (Page 4, lines 17-23)

Figure 3 illustrates timing diagrams of three simultaneous infrared transmissions by three separate transmitters over a four-second period. A pulse burst of 20 milliseconds duration defines a unique binary identification code that is transmitted approximately once a second with its position in time relative to the start of each second determined by an algorithm. As an example, when the code bursts 40 of all three badges line up at time 0 and thus interfere with one another as depicted at the far left of Figure 3, then during the next second no two pulses will simultaneously occur or line up in time because the pulses emitted by their respective transmitters occur in time according to a different code. (Page 14, lines 5 through page 15, line 22) An algorithm resident in the software of a microcontroller, part of the transmitter 18 is used to determine when within each second the unique identification code is transmitted by infrared pulse bursts. (Page 15, lines 10-14)

The algorithm accesses a 20 bit identification code at a rate of 1 bit per second with a bit value of "0" or "1" to establish in which half of the current second the code burst is to be transmitted. The algorithm also steps through the 20 bit identification code at a rate of 4 bits at a time during each

second using a current 4 bit part of the code to determine when the pulse bursts are to be transmitted within that first or second half of a second. (Page 15, lines 14-23)

As depicted in Figure 4, the pulse bursts, each with a duration of 20 milliseconds (which was arbitrarily selected) are made up of 14 infrared pulses 42 each with a duration of 10 microseconds. The 20 millisecond burst transmission is made up of three components. The first component is a start bit interval 46 during which an initial pulse 42 occurs to synchronize the receiver 16 for reading the transmission. The second component is 10 pulses occurring during an interval 48 representing a 20 bit code. The third component is three pulses 42 representing a 6 bit checksum occurring during interval 50. The checksum is detected, and used, by a receiver 16 to insure integrity of the received data. (Page 16, lines 1-17)

Figure 5 illustrates a pulse position scheme used to represent 2 binary bits by the transmission of 1 infrared pulse transmission 42. The scheme is utilized to minimize a battery drain each 10 microseconds duration of an infrared pulse represents an admission of a pulse occurring sometime during a 1.5 millisecond bit space 52. The bit space is defined to

provide four (4) discrete time intervals into which a pulse can occur. A 2 binary bit code 00 is represented when the pulse occurs in the first of the four intervals. A 2 binary bit code 01 is represented when the pulse occurs in the second of the four intervals. A 2 binary bit code 10 is represented when the pulse occurs in the third of the four intervals. A 2 binary bit code 11 is represented when the pulse occurs in the fourth of the four intervals. (Page 16, line 18 through page 17, line 22)

Figure 6 illustrates schematically the circuitry of the transmitter 18 which includes a microcontroller 70 comprised of an IC package containing a programmable memory for an operating program whose function is to define an unique 20 bit identification code for uniquely identifying the transmitter from among all other transmitters and other possible sources of infrared pulse emissions occurring within the receiving range of the receivers 16. (Page 18, lines 6-14) A serial bit stream of 125 microseconds wide logic pulses are output on data line 74 to a monostable multi-vibrator 80 which produces an output on line 81 in the form of pulses, each having a width of 10 microseconds, for transmission which turns ON a MOSFET transistor 82. Infrared light emitting diodes 84A and 84B are

energized when transistor 82 is turned ON. Resistor 76 and capacitor 78 form an R-C circuit which determines the 10 microsecond pulse width output by multi-vibrator 80. (page 18, line 21 to page 19, line 1)

Figures 7 and 8, illustrate the circuitry for the infrared receiver which includes a diode receiver called a Pin photodiode 118 to detect impinging IR energy emitted by the diodes 84A and 84B of the IR transmitters. (page 20, lines 12-14) A pulse output by the diode 118, having a duration of 10 microseconds, is converted by preamplifier 126 to a logic pulse of approximately 50 to 300 microseconds in duration (page 21, lines 9-13) which is applied by line 110 through a voltage level conversion circuit shown in Figure 9. The voltage level conversion circuit includes voltage level resistors 162 and 164 coupled to the gate of transistor 168 to provide a +5 VDC pulse to microcontroller 158, uart (universal asynchronous receiver transmitter) and a serial data transceiver 148. (page 22, lines 15-20) Sampling of the input bursts by the microcontroller 158 is used to establish the validity of the identification code which is illustrated in Figure 4 and as discussed previously, consists of a start pulse followed by ten pulses representing a 20 bit code followed by three pulses representing a

six bit checksum. (page 22, lines 20-25) A believed novel feature of the invention is to provide an operating program for the microcontroller to utilize bursts from the received identification code to recalculate a checksum and then compare the freshly recalculated checksum with the checksum received with the identification code. When the freshly recalculated checksum equals the checksum received with the identification code the validity of the code is established. In this way, when too few or too many code bursts are detected, the transmissions are ignored. (page 23, lines 1-14) The uart 156 is an integrated circuit that converts parallel data from microcontroller 158 to serial data output at a selected baud rate to the integrated circuit 148 which delivers serial data output to differential outputs 8A and 8B for transmission over a twisted wire pair. (page 24, lines 5-23) When a validated code is established, a signal is sent to the intelligent locator arbitrators $6_1$, $6_2$, - - - $6_{32}$ by serial bus 8. (page 23, lines 15-19)

In Figure 11 there is shown the circuitry of an intelligent locator arbitrator (ILA) 6 which includes a microcontroller 222 having a resident program to read identification codes reported by each ILR receiver 16 every time a code transmitter 18 is carried into the detection range of a receiver

16. The microcontroller sends a start event message containing the identification code and an identification number of the receiver. The microcontroller contains static RAM to store the identification code in a table of information for that particular receiver and continues the storage until the receiver stops reporting the identification code for more than ten seconds. The microcontroller then sends a stop event message to the computer and the identification code is removed from the static RAM. (page 27, lines 18 to page 28, line 6). Operating software in the CPU 228 receives the start and stop events from the arbitrators, time-stamps the events and stores the events in the data base. The storage of the start event includes an identifying number of the receiver, the identification code of the transmitter, and the real time of the occurrence of the start event. The storage of the stop event includes the identifying number of the receiver, the identification code of the transmitter that is removed from the reception area of the receiver, and the real time of the occurrence of the stop event. (page 29, lines 9-19) A report can be obtained from the central computer using the keyboard for access in a printer. (page 28, line 23 through page 30, line 5)

6. Issues

The broad issue presented in this appeal is whether the differences between the subject matter of the present invention and the prior art references are such that the subject matter of the present invention, taken as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art.

More particularly, there are two issues as to whether under 35 U.S.C.§103 the present invention is obvious and unpatentable. The first issue of obviousness, is whether the present invention is unpatentable over the Guest 4,990,892 patent in combination with Mufti 5,363,425 and Haner 3,403,381 patents. The second issue of obviousness is whether the present invention is unpatentable over the same references identified in the first issue and further in view of Warren 5,206,637 patent and pages 5-2 and 5-12 through 5-15 of a book entitled Understanding Data Communications by Radio Shack.

7. Grouping of the Claims

Appellant wishes to group the claims of the present application as follows for the purpose of identifying which claims are by the Appellant

as standing or falling by this appeal:

Group I - Claims 49, 50, and 53-65

Group II - Claims 51 and 52

Group III - Claims 66-71

8. Argument

Fundamental to Appellant's claim to invention in claims 49-64 is the recitation dealing with the formation of infrared pulse bursts that uniquely occur to prevent synchronization with other pulse bursts that can be detected by the same detector in a facility. The relevant claim language in claim 49 is:

> "means responsive to an algorithm for controlling said means for transmitting said infrared pulse bursts during a predetermined time interval, with the currence of each plulse burst in time relative to the start of each time interval varying from time interval to time interval, the amount of said varying being controlled by said means responsive to an alogorithm incorporated in each transmitter using said unique binary identification code of that transmitter for preventing synchronization with other transmitters and with ambient periodic resident signals in the facility"

and the relevant in claim 65 is:

> "an algorithm unique to and with that transmitter means for controlling said controller means for producing emissions of

infreared pulse bursts by said infrared emitting means for defining a unique binary identification code at diverse times during each of predetermined time intervals, said algorithm controlling said controller means for causing each pulse burst in each successive time interval relative to the start of each of the successive time intervals to occur differently from time interval to time interval"

Claims 49-65 have been rejected based on the contention that the Guest transmitter could obviously be made to function in response to an algorithm or software alleged to be disclosed by Mufti. In support of the combination of references it is contended that a software programable device is easier and cheaper to mass produce and provides flexibility because the software can be modified to provide different functions. An alternative was advanced that Mufti could be modified to send infrared bursts described by Guest and which would be an advantage over RF transmission as not requiring FCC licensing.

The argument of this rejection is clearly based on the impermissible hindsight reconstruction of applicant's claimed invention as there is clearly no basis in the references themselves to support the combination. The argument of the rejection fails to advance any reason why one would modify the references particularly the modifications to do

something the references do not even merely suggest.

The Guest reference, which is owned by the Appellant and the forerunner of the Appellant's present invention, while transmitting infrared pulse bursts was severely limited by reason of the resistor-capacity combinations which select the number of pulses that can be transmitted during a pulse burst. The Guest system was used to only identify classes of individuals. The identity of an individual could not be determined. From column 11, at line 30, the identity of each class is defined by a train of pulses and the example given describes that the pulse trains are of one of three frequencies. The pulse train at the specific frequency was transmitted during specific bursts periods. (column 11, lines 44-48) The notion of using an algorithm unique to the badge to control the times when pulse bursts occur during regular intervals is neither disclosed or suggested by Guest. To combine references the obviousness of the combination of references must come from the references themselves not from the impermissible hindsight use of Appellant's invention. In rejection it is contended that Mulfti discloses an algorithm or software but no such disclosure can be found. Mulfti discloses at column 8, RF bursts, not IR, having a basic structure

shown in Figure 9. The random intervals at which RF bursts are transmitted as best understood is found in column 8, lines 18-22:

> "In order to reduce the possibility of fraud on the system, the transmitter units in the asset tags and ID badges make use of a counter increase the sequence number by one each time a tag or ID badge sends out a new burst."

The circuitry as shown in Figures 5 and 7 and while there is a microcontroller there is no disclosure of an algorithm or even more importantly of the use of an algorithm as the control for varying the time interval between successive bursts and further that the means which is responsive to the algorithm is also response to the unique binary identification code. Mulfti uses only an ID code and no algorithm whereby the Mulfti system is limited to the capacity of the ID code for distinguishing between the badges. The Mufti system requires the transmission of FR signals which are not limited to the line of sight whereas infrared is so limited. Thus, the Mufti system, unlike the Appellants and Guest, will always respond to all badges in the facility and must distinguish amongst all badges whereas the Appellant's system need only distinguish among badges within line of a given receiver. There is no basis to support the argument of

the rejection that it would be obvious to use IR in the Mufti system to avoid FCC regulations. The fact remains that the Mufti disclosure does not suggest IR transmissions. The rejection continues by contending that it would have been obvious to randomly specify the transmission intervals as suggested by Haner.

The reliance on Haner for outputting a pulse at random times is wholly misplaced as far as Appellant's claims. Random outputting is not part of Appellant's invention and claims 49 and 65 as noted supra specifies that it is the algorithm that controls the transmission of infrared pulse bursts during predetermined time intervals with the occurrence of each burst in time relative to the start of each time interval varying with time interval to time interval the amount of said varying being controlled by said means responsive to an algorithm. Similar language was noted supra in regard to claim 65. There is nothing random about the transmissions in Appellant's invention and therefore the teaching of random transmissions by the disclosure by Haner renders the reference irrelevant particularly for the purposes advanced in the rejection.

Appellant argues that there is a lack of motivation to combine

such references. As stated in In re Deminski, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986) and recently affirmed in In re Hans Oetker 24 USPQ 2d 1443, in order to rely on a reference as a basis for rejection of the Appellant's invention, the reference must either be in the field of Appellant's endeavor, or if not, then be reasonably pertinent to the particular problem with which the inventor was concerned such that a person or ordinary skill in the art would reasonably be expected to look in that field for a solution to the problem facing the invention. In addition, In re Oetker states that where there is a combination of references from non-analogous sources, there must be some reasons, suggestion or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. Appellants also direct attention to in In re Fritch, 972 F.2d 1260, 23 USPQ 1780 (Fed. Cir. 1992). Pointing out that references must suggest a desirability of and thus the obvious of the modifications proposed by the examiner in the rejection now under appeal.

The second issue of obviousness presented by the rejection expands the combination of references to additionally include the Warren reference and select pages from a book by Radio Shack. The Warren

reference is to a programmable unit for an electronics locking system for a storage unit. The second issue relies on this reference for the proposition that if appellants claims are interpreted to require a microcontroller with a memory and microcode, then the Warren reference suggests the obviousness to include ID stored in memory associated with the microcontroller. For reasons given supra, there simply is no reasonable basis found in the Warren reference that would suggest the obviousness to modify the teaching of an already improper combination of references, namely, Guest, Mufti and Haner with the Warren reference simply because the Warren reference discloses a microcontroller per se for storing access codes.

The claims comprising Group II are believed to patentably distinguish over the references in the two issues by the additional recitation in these claims of a microcontroller having a memory containing the unique binary identification code forming part of the transmitter that is responsive to the algorithm. The argument of the rejection contends only that Mufti fails to describes a microcode. The argument is wholly erroneous that Guest discloses 16 bit code word. The Warren reference is relied upon because it per se describes a microcode which disclosure has nothing to do with the

personnel locator system and thus was selected only through improper hindsight.

The claims comprising Group III call for the pulse position scheme in which at least 2 binary bits of the identification code are identified by 1 pulse and were rejected by expanding the four (4) references (Guest, Mufti, Haner and Warren) to include the Radio Shack reference. The Radio Shack reference has been relied upon only for a per se showing that multiple bits per baud can increase the signaling rate on a channel. The pulse positioning scheme is then rationalized as obvious contending that 2 bits can be modulated as a pulse or a sound wave depending on the phase shift of the wave shown in Table 5-4 or 5-6. The argument is clearly hindsight since in fact the sole purpose of the pulse position scheme is to reduce not increase the information that can be transmitted with a single pulse. Clearly, the Radio Shack reference is not directed to the problem sought to be solved by Appellant. The pulse position scheme is simply not to be found during the combination of the five (5) different references. It has been held that the mere combination of five (5) different references is in and of itself suggestive of improper hindsight.

For the foregoing reasons, the Appellant requests that the rejection of Appellant's claims be overturned.

Respectfully submitted,

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January 9, 1997

Debra J Koch

Debra J. Koch
Date: January 9, 1997

APPENDIX "A"

49. A locating and monitoring system installable on the premises of a facility, said system including:

a plurality of transmitter means adapted for movement about said facility with a person, with an animal or with equipment to allow identification of such transmitter means at any of diverse sites in the facility, each of said transmitter means including means for transmitting infrared pulse bursts, each of said infrared pulse bursts defining a unique binary identification code comprising a plurality of binary bits of sufficient number that each of said transmitter means in said facility transmits a different binary identification code, means responsive to an algorithm for controlling said means for transmitting said infrared pulse bursts during a predetermined time interval, with the occurrence of each pulse burst in time relative to the start of each time interval varying from time interval to time interval, the amount of said varying being controlled by said means responsive to an algorithm incorporated in each transmitter using said unique binary identification code of that transmitter for preventing

synchronization with other transmitters and with ambient periodic resident signals in the facility;

receiver means responsive to said pulse bursts by said plurality of transmitter means at each of said diverse sites in said facility for detecting infrared pulse bursts by said transmitter means; and

central means responsive to said receiver means for establishing the location of said transmitter means in said facility.

50. The system of claim 49 wherein said transmitter means includes a microcontroller responsive to said algorithm.

51. The system of claim 49 wherein said means for transmitting pulse bursts includes a microcontroller having memory containing said unique binary identification code.

52. The system of claim 51 wherein said microcontroller includes microcode to calculate a checksum of said binary identification code and generates said pulse bursts which include a start bit, said binary identification code, and said checksum.

53. The system of claim 49 wherein said identification code comprises at least 20 binary bits to provide at least 1,048,576 different identification codes.

54. The system of claim 49 wherein each pulse burst is of about 20 milliseconds in duration.

55. The system of claim 49 wherein said pulse bursts each occur once in the predetermined time interval of about one second.

56. The system of claim 49 wherein said receiver means responsive to said pulse bursts includes a microcontroller for executing microcode to establish a valid code burst from received pulse bursts.

57. The system of claim 49 wherein each pulse of said pulse bursts is transmitted by a 10 microsecond flash of infrared light.

58. The system of claim 49 wherein said receiver means responsive to code bursts includes a plurality of discrete receivers each having a reception range about a premises with an allowable overlap with the reception range of another of such receivers; each of said receivers being responsive to said pulse bursts to validate said binary identification code and

thereby establish presence of said transmitter means within the reception range of a receiver.

59. The system of claim 58 wherein said central means includes gathering station means for validating outputs from each of said plurality of receivers and forming start and stop events, said start events including the identity of the one receiver of said plurality of receivers, the binary identification code of one transmitter of the said plurality of the transmitters, and when the pulse bursts of such transmitter was detected by such receiver; said stop event including the identity of the one receiver of said plurality of said receivers, the unique identification code of the said one transmitter when loss of reception has occurred within the reception range, and when such loss of reception occurred.

60. The system of claim 59 wherein said gathering station means includes a plurality of gathering stations connected by a serial port to a central computer which includes a storage medium for storing said start and stop events derived from each of said plurality of gathering stations.

61. The system of claim 60 wherein said central computer includes a plurality of said serial ports, each of said ports being connected to a plurality of gathering stations for receiving said start and stop events.

62. The system of claim 61 wherein said central computer has a interface including a terminal and a keyboard for a user to request and receive the location of any of said transmitter means.

63. The system of claim 62 further including display means responsive to said central computer for assembling reports, and means to input commands to said central computer by an authorized operator to assemble said reports of movements of any of said transmitter means recorded and stored in said storage medium.

64. The system of claim 63 for tracking the movements of hospital personnel and allied hospital equipment, and interfacing to an existing nurse call hospital system by providing: that each of said plurality of said transmitter means comprises a portable communication badge worn by allied hospital personnel, including nurses, and attached to said hospital equipment; said means for establishing the location including a receiver installed in each patient room to interface with said nurse call hospital

system; a receiver installed in each patient room for indicating when said allied hospital personnel wearing one of the said badges enters the room, and the class of a number of classes to which the allied hospital personnel belongs; and an interface between said central computer and said nurse call hospital system such that location queries entered at terminals of said hospital system are routed to said central computer.

65. A stationary receiver installable on the premises of a facility in combination with at least one transmitter means adapted for movement about said facility with a person, with an animal or with equipment to allow monitoring of such transmitter means within any of diverse sites in the facility, said transmitter means including infrared emitter means controlled by controller means for emitting infrared pulses, an algorithm unique to and with that transmitter means for controlling said controller means for producing emissions of infrared pulse bursts by said infrared emitting means for defining a unique binary identification code at diverse times during each of predetermined time intervals, said algorithm controlling said controller means for causing each pulse burst in each successive time interval relative to the start of each of the successive time intervals to occur differently from

time interval to time interval, said stationary receiver including means for detecting infrared transmissions of said pulse bursts and means responsive to said means for detecting for producing an electrical signal identifying said transmitter means.

66. The stationary receiver of claim 65 wherein said pulse bursts include a pulse position scheme to represent at least two binary bits of the identification code with one pulse for reducing the number of pulses required to represent said unique binary identification code.

67. The stationary receiver of claim 65 wherein said pulse bursts include an error detection word with said binary identification code and wherein said means for receiving is responsive to said error detection word to insure integrity of reception of pulse bursts.

68. The stationary receiver of claim 67 wherein said error detection word is transmitted according to a pulse position scheme wherein at least two binary bits of the error detection word are represented with one pulse.

69. The stationary receiver of claim 67 wherein said error detection word is a binary checksum.

70. The stationary receiver of claim 67 further including means for recalculating said error detection word using the received binary identification code and means for comparing such recalculated error detection code with said received error detection code to validate an error free pulse burst reception.

71. The stationary receiver of claim 65 wherein the means of receiving includes a microcontroller for executing microcode to establish a valid code burst from received pulse bursts.